

# PATENT SPECIFICATION



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539,577

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## PROVISIONAL SPECIFICATION

### Improvements in and relating to Protective Headwear

We, BYSON APPLIANCE COMPANY LIMITED, a British Company, of Woolfold, Bury, Lancashire, and ERNEST HARRISON, a British subject, of the said Company's address, do hereby declare the nature of this invention to be as follows:—

This invention relates to protective helmets for wear, of the kind popularly known as "tin hats", although they are not necessarily made of metal.

The main object of the invention is to provide improved padding and shock-absorbing arrangements for such head wear, in forms which are lighter in weight, cheaper to produce and easier to assemble than are those usually adopted, whilst affording all the necessary protection against impact, ventilation and other usual desiderata.

According to the invention, the head-engaging part of the helmet comprises a series of side-by-side resilient pads, for example of sponge rubber, located in side-by-side pockets in a fabric carrier, the carrier being of annular form. The said head-engaging part is carried by a spider or like frame member comprising thin flexible strips of compressed fibre or like non-tearable material, which spider is in turn secured to the crown of the main shell of the hat, preferably at the tip.

The usual or an equivalent cushion or pad of resilient material (e.g. sponge rubber) will be provided in the crown of the helmet and this, according to a further feature of the invention may be adapted to cover over the securing screw or rivet for the said spider.

The fabric carrier forming the pockets for the resilient pads will be made from a strip of material folded on a longitudinal centre line and stitched transversely, at intervals, from the edges to the fold. Such material, where necessary, will be of the anti-gas type, and will also be waterproof and greaseproof.

The spider may consist merely of two strips crossing each other at right angles, or of more than two strips equally spaced around a central point, and in all cases their ends will enter into and be secured within some of the said pockets, either on the inner or outer side of the resilient

pad, or between two resilient pads. The pockets for the pads will usually have their mouths uppermost, and whilst the mouths may be left open, they will preferably be closed, either by stitching or stapling or otherwise.

In an example of the invention, the outer shell of the helmet consists of a plastic moulding, made from one of the so-called reinforced or fabricated moulding mixtures, and is of the usual size and shape, except that it is somewhat thicker at the tip than elsewhere. Secured by a screw passing into such thicker part of the shell, from the interior of the crown is a flexible frame or spider comprising two strips of compressed fibre arranged at right angles to each other and stapled together independently of such screw. These strips extend longitudinally and transversely of the hat crown, and their extremities enter into, and are secured within pockets in a cushion member produced as follows:—

A strip of textile fabric, coated on one face with a mixture resistant to war gases is first folded longitudinally on a centre line, is then stitched transversely at intervals of about 3" from the raw edges to the fold, and finally has its ends stitched together to bring it to annular form. Into each of the pockets thus produced is inserted a rectangular pad of sponge rubber, to fill the pocket, and the several pockets are then closed down on to the rubber at their mouths by longitudinal stitching, or by stapling or the like. The result is that the annular cushion member is suspended from the shell of the helmet by means of the flexible frame.

Secured against the inside faces of the said frames, at the tip, of the crown, is an oval shaped pad of sponge rubber, forming a concussion pad for the top of the wearer's head. Such pad may have a central through hole at the centre, to give access to the screw or rivet which holds the frame in position, or it may have an incision or slit allowing a tongue of rubber to be folded back to give access to the screw. When the through hole is provided, it may be covered by a sheet of fabric secured to the lower face of the

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pad, or it may be filled up with an inserted plug of similar resilient material.

In a helmet made according to this invention, there is substantially less weight than in one of the standard or Service type, there are fewer rivets, there is a more comfortable fitting to the

wearer's head, and the cost of material and labour is greatly reduced.

Dated this 3rd day of December, 1940.

For the Applicants,

WILSON, GUNN & ELLIS,

Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

## COMPLETE SPECIFICATION

### Improvements in and relating to Protective Headwear

10 We, BYSON APPLIANCE COMPANY LIMITED, a British Company, of Woolfold, Bury, Lancs, and ERNEST HARRISON, a British subject, of the said Company's address, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to protective helmets for wear, of the kind popularly known as "tin hats", although they are not necessarily made of metal.

The main object of the invention is to provide improved padding and shock-absorbing arrangements for such head wear, in forms which are lighter in weight, cheaper to produce and easier to assemble than are those usually adopted, whilst affording all the necessary protection against impact, giving the required ventilation and satisfying other usual desiderata. A minor object is to provide means for protecting the wearer's ears from blast, etc., when such means is required.

35 According to the invention, the head-engaging part of the helmet comprises a series of side-by-side or end-to-end resilient pads, for example of sponge rubber, located in side-by-side or end-to-end pockets in a fabric carrier, the carrier being of annular form. The said head-engaging part will be indirectly carried from the crown of the helmet, say by a spider or like frame member comprising thin flexible strips of compressed fibre or like non-tearable materials, which spider is in turn secured to the crown of the main shell of the hat, preferably at the tip.

50 The usual or an equivalent cushion or pad of resilient material (e.g. sponge rubber) will be provided in the crown of the helmet and this, according to a further feature of the invention, may be adapted removably to cover over the securing screw or rivet for the said spider.

55 The fabric carrier forming the pockets for the resilient pads will be made from a strip of material folded on a longitudinal centre line and stitched transversely at intervals, from the edges to the fold.

Such material, where necessary, will be of the anti-gas type, and will also be waterproof and greaseproof.

The spider may consist merely of two strips crossing each other at right angles, or of more than two strips equally spaced around a central point, and in all cases their ends will enter into and be secured within some of the said pockets, either on the inner or outer side of the resilient pad, or between two resilient pads. The pockets for the pads will usually have their mouths uppermost, and whilst the mouths may be left open, they will preferably be closed, either by stitching or by stapling or otherwise.

In cases where it is required that the cushion or pad in the crown of the hat be prevented from coming on to the wearer's head in normal use, but that a space be left above the head, the improved helmets may be further characterised by the provision of an adjustable inner crown or support of flexible material, carried by the above-described head-engaging element. Conveniently, such inner crown or support may comprise a number of flaps or tongues extending from a similar number of the said pockets, and a draw-cord threaded through their inner hemmed edges.

Resilient ear-covering flaps may be provided when required, also carried by the head-engaging element, and capable of being folded back into the helmet and retained there when not in use.

In the accompanying drawing examples of the invention are illustrated:—

Fig. 1 is a longitudinal vertical section through a hat according to one example of the invention and having all the features above referred to;

Fig. 2 is an inverted plan of the same, but with some parts broken away to reveal the inner structure more clearly;

Fig. 3 is an exploded view of certain parts to illustrate the construction of the head-engaging elements shown in Figs. 1 and 2;

Fig. 4 is a like sectional view to Fig. 1, but on a transverse plane instead of a longitudinal plane, and showing an alter-

native position for one part as hereinafter explained in addition to illustrating an optional modification;

Fig. 5 is a perspective view, partly in section of a modified form of head-engaging element.

Referring first to Figs. 1 to 4 the outer shell 1 of the helmet consists of a plastic moulding, made from one of the so-called reinforced or fabricated moulding mixtures, and is of the usual size and shape, except that it is somewhat thicker at the tip 1<sup>a</sup> than elsewhere. Secured by a screw 2 passing into such thicker part 1<sup>a</sup> of the shell, from the interior of the crown, is a flexible frame or spider 3 comprising two strips of compressed fibre arranged at right angles to each other, and stapled together independently of such screw. These strips extend longitudinally and transversely of the hat crown, and their extremities enter into, and are secured within pockets in a cushion member produced as follows:—

A strip of textile fabric 4 coated on one face with a mixture resistant to war gases, is first folded longitudinally on a centre line, is then stitched transversely at intervals of about 3", as at 5, from the raw edges to the fold, and finally has its ends stitched together as at 6 to bring it to annular form. Into each of the pockets thus produced is inserted a rectangular pad 7 of sponge rubber, to fill the pocket, and the several pockets are then closed down on to the rubber at their mouths by longitudinal stitching 8, or by stapling or the like. The result is that the annular cushion member, after having the ends of the spider 3 inserted into four of the pockets and held there by the rivets 9, is suspended from the shell 1 of the helmet by means of such flexible spider or frame.

The construction of the head-engaging part is more particularly shown in Fig. 3, where one of the pads 7, and an end of the frame 3, are shown withdrawn from their pocket in the fabric carrier 4. The ends of the frame 3 may enter the pockets either on the head-ward side of the pad, or on the outer side, or between two pads or two portions of a single pad, and may enter the pocket at its mouth or through an opening in one of its side walls.

Extending from each of those pockets in which the ends of the spider 3 are inserted, is an inwardly-directed flap or tongue 10, which may be an extension of the fabric 4 or may be a separately-formed portion of fabric secured to the pocket wall by stitching. In any case the rivets 9 will preferably pass through the parts 10 or through the area of connection with the pocket wall. These flaps 10 are each hemmed at their inner edges

and through the hems is passed a draw string 11, knotted to itself at 12, and which may or may not be elastic. By adjusting the length of the string 11, and thereby varying the maximum inclination of the tongues 10, the degree to which the helmet fits down over the wearer's head may be varied, but a normal space between the tongues and the pad 13 may be ensured.

Such pad 13 is secured against the inside faces of the said frame 3, at the tip of the crown, by means of the rivets 14 and is an oval shaped pad of sponge rubber, forming a concussion pad for the top of the wearer's head. This pad may have a central through hole at the centre, to give access to the screw 2 which holds the frame 3 in position, or it may have an incision or slit 15 (Fig. 2) allowing a tongue of rubber to be folded back to give access to the screw, see Fig. 4. When the through hole is provided, it may be covered by a sheet of fabric secured to the lower face of the pad, or it may be filled up with an inserted plug of similar resilient material.

Instead of the frame 3 being held in position by a screw, a strong rivet, for example a bifurcated rivet, may be adopted for that purpose.

In Fig. 4, there is also shown a pair of ear-flaps, each consisting of a sponge rubber pad 14 secured to one face of a flexible fabric portion 15 suitably secured to one wall each of the pockets into which the transverse member of the frame 3 is fitted. The two flaps are shown in their different positions, that at the left-hand side of the Figure being in the depending position, for use in covering the ear of the wearer, whilst the other is shown in a raised position where it may be tucked between the wearer's head and the annular head-engaging part. Although shown on the head-ward side of the said annular part, the ear pad 14 may, if desired, be tucked between such annular part and the shell 1 of the helmet.

Referring now to Fig. 5, the head-engaging part is made in a slightly different manner, in that the fabric 4 is first folded longitudinally, then stitched along the longitudinal meeting edges, and the resulting tube turned inside out. The rubber pads 7 are then inserted from the end, and the tube is stitched transversely between them. Further, at the part where the frame 3 enters one of the pockets, the pad 7 is made shorter, and has an additional but smaller pad at each side, this arrangement being more conducive to the wearer's comfort.

The improved helmets will be provided with suitable clips or links such as those

16 for attachment of the chin straps.

In a helmet made according to this invention, there is substantially less weight than in one of the standard or service type, there are fewer rivets and like mechanical connections, there is a more comfortable fitting to the wearer's head, and the cost of material and labour is greatly reduced.

10 Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

15 1. A protective helmet wherein the head-engaging part comprises a series of resilient pads, for example of sponge rubber, located in side-by-side or end-to-end pockets in a fabric carrier of annular form.

20 2. A helmet according to claim 1, wherein the head-engaging part is carried on the extremities of a spider or like frame composed of thin flexible strips of non-tearable material such as compressed fibre, which spider is in turn secured to the crown of the hat shell at or near the tip.

30 3. A helmet according to claim 2, wherein there is a cushion or pad of resilient material in the crown of the hat, below the said spider or frame.

4. A helmet according to claim 3, wherein the cushion or pad of resilient material is formed so as to cover the connection of the spider to the hat shell, but so as to give access to that connection when required.

5. A helmet according to any of the preceding claims, further characterised by an adjustable inner crown or support of flexible material carried by the head-

engaging part, and arranged to ensure a space between the top of the wearer's head and the shell of the helmet.

6. A helmet according to claim 5, wherein the inner crown or support comprises a number of flaps or tongues extending from a similar number of pockets in the head-engaging part, such flaps or tongues being hemmed on their inner edges and a draw-cord being threaded through the hems to adjust the degree of freedom of the flaps or tongues.

7. A helmet according to any of the preceding claims wherein the side-by-side or end-to-end pockets are formed by folding a strip of material longitudinally and stitching it transversely at intervals, the resilient pads being inserted laterally, and the pockets then being closed.

8. A helmet according to any of the claims 1 to 6, wherein the side-by-side or end-to-end pockets are formed by folding a strip of material longitudinally, stitching the longitudinal edges together, turning the tube inside out and stitching transversely, a resilient pad being inserted before each transverse stitching.

9. A helmet according to any of the preceding claims, and having resilient ear-covering pads carried by the head-engaging part and capable of being folded back into the helmet and retained there (as set forth) when not required for use.

10. A protective helmet constructed substantially according to any of the forms herein described and illustrated.

Dated this 12th day of February, 1941.

For the Applicants,

WILSON, GUNN & ELLIS,

Chartered Patent Agents,

54/56, Market Street, Manchester, 1.

Fig. 1.

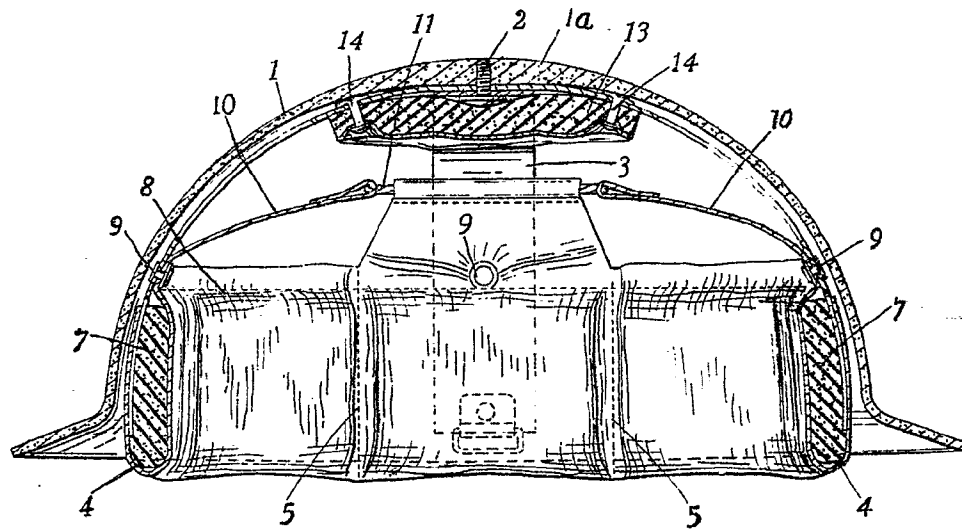
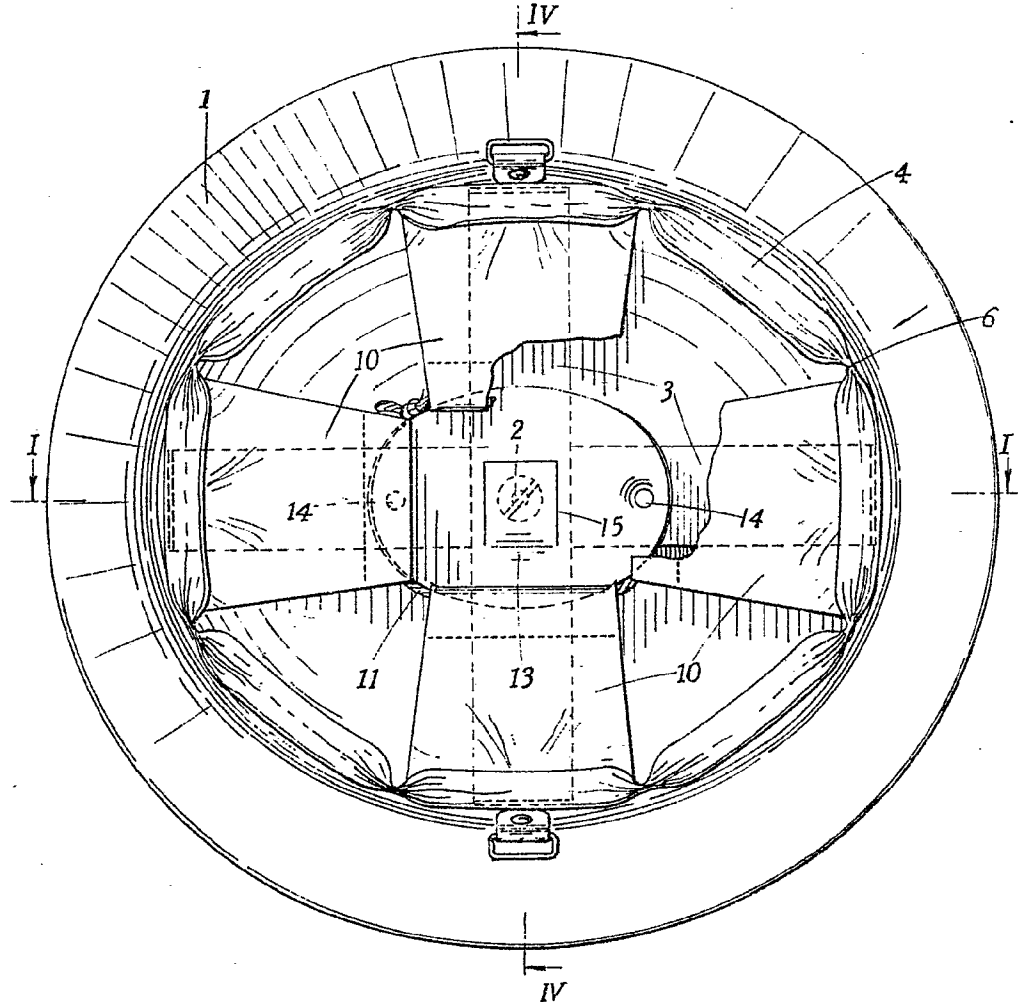


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]

SHEET 1

Fig. 3.

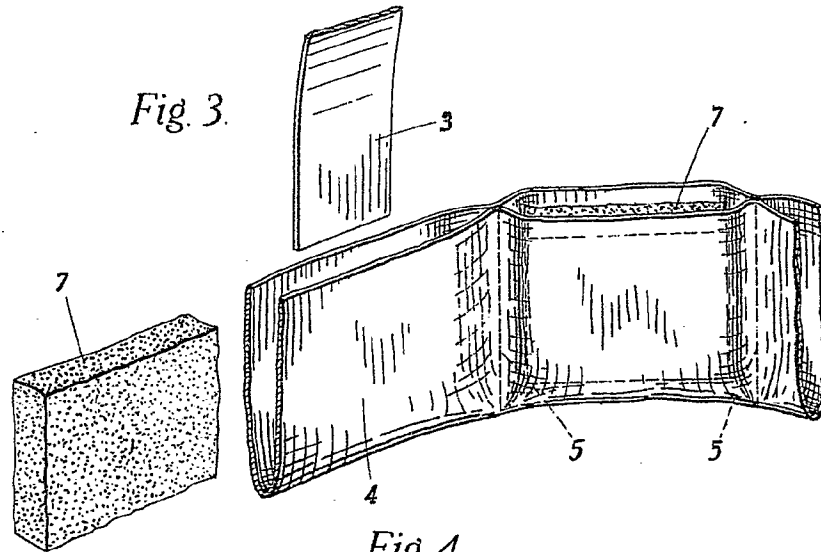


Fig. 4.

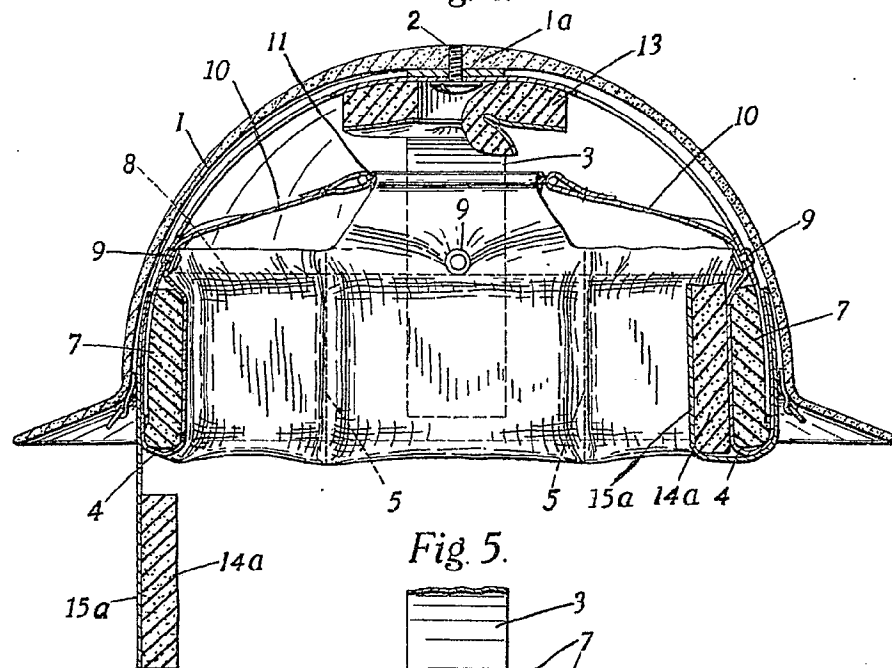
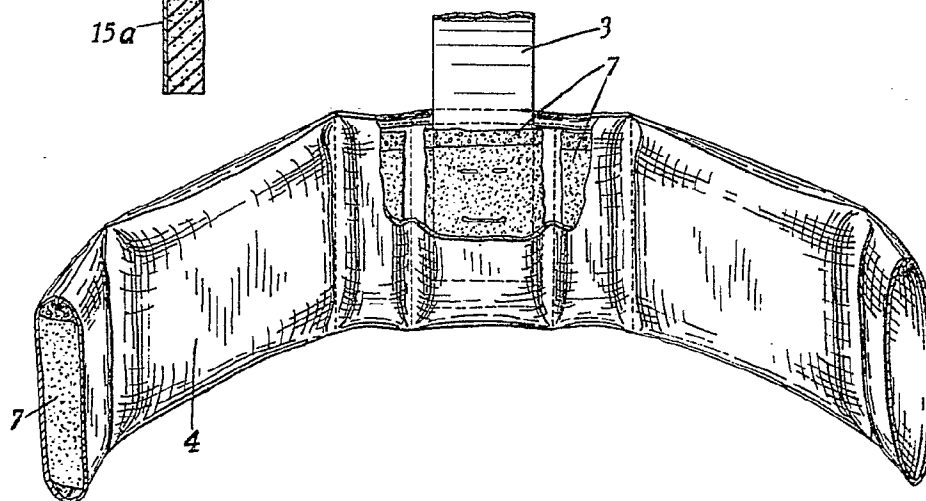


Fig. 5.



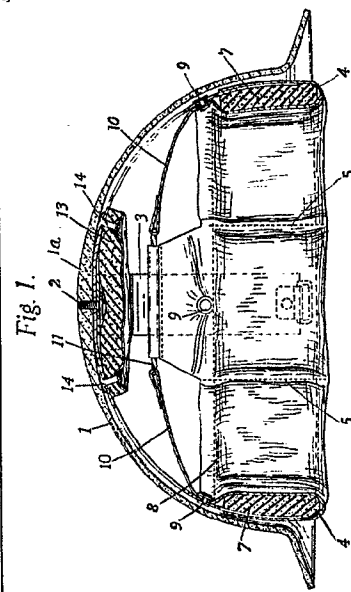


Fig. 1.

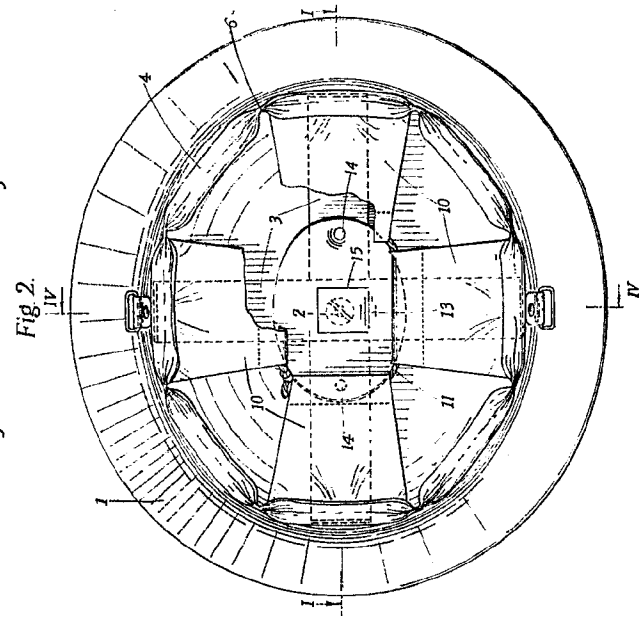


Fig. 2.

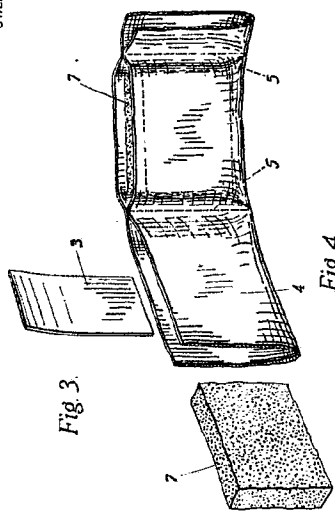


Fig. 3.

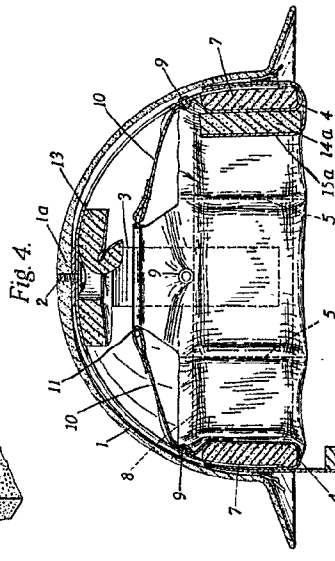


Fig. 4.

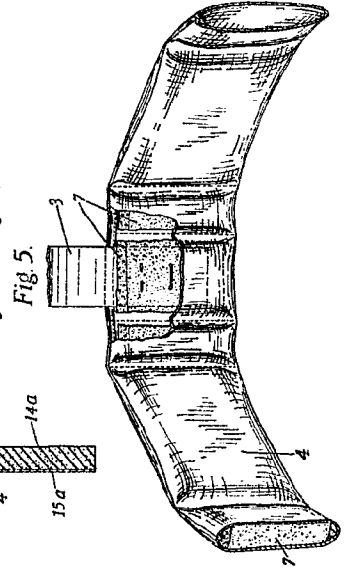


Fig. 5.

[This Drawing is a reproduction of the Original on a reduced scale]